What is claimed is:

1. A method for converting a desired lens design to a geometry of a contact lens to be produced in a manufacturing system, the method comprises:
   (1) providing a lens design of a contact lens having a central axis, an anterior surface and an opposite posterior surface;
   (2) projecting a predetermined number of points within a predetermined surface tolerance onto a surface of the lens design along each of a number of evenly-spaced semi-diameter spokes, each spoke radiating outwardly from the central axis; and
   (3) for each of the spokes, generating a semi-meridian which is continuous in first derivative and includes a series of arcs and optionally straight lines, wherein each arc is defined by fitting at least three consecutive points into a spherical mathematical function within a specified concentricity tolerance, wherein each of the straight lines is obtained by connecting at least three consecutive points.

2. A method of claim 1, wherein the number of the points to be projected onto the surface of the lens design along each of the semi-diameter spokes is determined by dividing the distance from the central axis to lens edge by a point spacing of at least about 1 micron.

3. A method of claim 2, wherein the point spacing is from about 5 to about 25 microns.

4. A method of claim 3, further comprising projecting additional points in a region where the curvatures of the surface change sharply.

5. A method of claim 4, wherein the step of projecting additional points is performed according to a procedure including:
   (i) grouping all of the points projected along a semi-diameter spoke into a series of groups, each group composed of three consecutive points, a first point, a middle point and a third point;
   (ii) one group at a time from the central axis to the edge or from the edge to the central axis, analyzing the curvature of the surface at the middle point of the group by comparing a distance between the middle point and a line linking the

first and the third points of the corresponding group with the predetermined surface tolerance;

(iii) projecting an additional point between the first and the middle points in the group, provided that the distance between the middle point and the line linking the first and third points of the group is larger than the predetermined surface tolerance; and

(iv) repeating steps (i) to (iii) until the distance between the middle point of each of the series of groups of points projected along the semi-diameter spoke and the line linking the first and the third points of corresponding group is equal to or less than the predetermined surface tolerance.

6. A method of claim 5, wherein the number of the evenly-spaced semi-diameter spokes is a number between 24 to 384.

7. A method of claim 6, wherein the contact lens is a customized contact lens or a contact lens having a complex surface design.

8. A method of claim 1, wherein the number of the points to be projected onto the surface of the lens design along each of the number of evenly-spaced semi-diameter spokes is determined according to a procedure including:

(I) projecting evenly-spaced points separating by a point spacing of about 5 to about 25 microns along a semi-diameter probing spoke at an azimuthal angle at which one or more complicated features of the surface are located;

(II) dividing all of the points into a series of groups, each group composed of three consecutive points, a first point, a middle point and a third point;

(III) one group at a time from the central axis to the edge or from the edge to the central axis, analyzing the curvature of the surface at the middle point of the group by comparing a distance between the middle point and a line linking the first and the third points of the corresponding group with the predetermined surface tolerance;

(IV) projecting an additional point between the first and the middle points in the group, provided that the distance between the middle point and the line linking the first and third points of the group is larger than the predetermined surface

tolerance, wherein point spacing between the first and additional points is equal to point spacing between the additional and middle points;

(V) repeating steps (II) to (IV) until the distance between the middle point of each of the series of groups and the line linking the first and the third points of corresponding group along the probing spoke is equal to or less than the predetermined tolerance; and

(VI) outputting the number of the points to be projected onto the surface of the lens design along each of the number of evenly-spaced semi-diameter spokes and point spacings for pairs of neighboring points.

9. A method of claim 8, wherein the number of the evenly-spaced semi-diameter spokes is a number between 24 to 384.

10. A method of claim 9, wherein the contact lens is a customized contact lens or a contact lens having a complex surface design.

11. A method for producing a contact lens, comprises:

(1) providing a lens design of a contact lens having a central axis, an anterior surface and an opposite posterior surface;

(2) projecting a predetermined number of points within a predetermined tolerance onto a surface of the lens design along each of a number of evenly-spaced semi-diameter spokes, each spoke radiating outwardly from the central axis;

(3) for each of the spokes, generating a semi-meridian which is continuous in first derivative and includes a series of arcs and optionally straight lines, wherein each arc is defined by fitting at least three consecutive points into a spherical mathematical function, wherein each of the straight lines is obtained by connecting at least three consecutive points;

(4) generating a data file containing information about the geometry of the lens in a form that is interpretably by a computer-controlled manufacturing device; and

(5) producing the contact lens or a molding tool for making the contact lens using the computer-controlled manufacturing device.

12. A method of claim 11, wherein the number of the points to be projected onto the surface of the lens design along each of the semi-diameter spokes is determined by dividing the distance from the central axis to lens edge by a point spacing of at least about 1 micron.

13. A method of claim 12, wherein the point spacing is from about 5 to about 25 microns.

14. A method of claim 13, further comprising projecting additional points in a region where the curvatures of the surface change sharply.

15. A method of claim 14, wherein the step of projecting additional points is performed according to a procedure including:

(i) grouping all of the points projected along a semi-diameter spoke into a series of groups, each group composed of three consecutive points, a first point, a middle point and a third point;

(ii) one group at a time from the central axis to the edge or from the edge to the central axis, analyzing the curvature of the surface at the middle point of the group by comparing a distance between the middle point and a line linking the first and the third points of the corresponding group with the predetermined surface tolerance;

(iii) projecting an additional point between the first and the middle points in the group, provided that the distance between the middle point and the line linking the first and third points of the group is larger than the predetermined surface tolerance; and

(iv) repeating steps (i) to (iii) until the distance between the middle point of each of the series of groups of points projected along the semi-diameter spoke and the line linking the first and the third points of corresponding group is equal to or less than the predetermined surface tolerance.

16. A method of claim 15, wherein the number of the evenly-spaced semi-diameter spokes is a number between 24 to 384.

17. A method of claim 16, wherein the contact lens is a customized contact lens or a contact lens having a complex surface design.

18. A method of claim 11, wherein the number of the points to be projected onto the surface of the lens design along each of the number of evenly-spaced semi-diameter spokes is determined according to a procedure including:

(I) projecting evenly-spaced points separating by a point spacing of about 5 to about 25 microns along a semi-diameter probing spoke at an azimuthal angle at which one or more complicated features of the surface are located;

(II) dividing all of the points into a series of groups, each group composed of three consecutive points, a first point, a middle point and a third point;

(III) one group at a time from the central axis to the edge or from the edge to the central axis, analyzing the curvature of the surface at the middle point of the group by comparing a distance between the middle point and a line linking the first and the third points of the corresponding group with the predetermined surface tolerance;

(IV) projecting an additional point between the first and the middle points in the group, provided that the distance between the middle point and the line linking the first and third points of the group is larger than the predetermined surface tolerance, wherein point spacing between the first and additional points is equal to point spacing between the additional and middle points;

(V) repeating steps (ii) to (iv) until the distance between the middle point of each of the series of groups and the line linking the first and the third points of corresponding group along the probing spoke is equal to or less than the predetermined tolerance; and

(VI) outputting the number of the points to be projected onto the surface of the lens design along each of the number of evenly-spaced semi-diameter spokes and point spacings for pairs of neighboring points.

19. A method of claim 18, wherein the number of the evenly-spaced semi-diameter spokes is a number between 24 to 384.

20. A method of claim 19, wherein the contact lens is a customized contact lens or a contact lens having a complex surface design.